CLAIMS

What is claimed is:

1. A method for treating a wrinkle in human skin, comprising:

generating a beam of radiation having a wavelength of between 1.3 and 1.8 microns and a fluence of between 10 and 150 joulesper square centimeter;

directing the beam of radiation to a targeted dermal region between 100 microns and 1.2 millimeters below a wrinkle in the skin; and

causing thermal injury within the targeted dermal region to elicit a healing response that produces substantially unwrinkled skin.

2. The method of claim 1 wherein the wavelength is about 1.5 microns.

3. The method of claim 1 further comprising the step of stretching the skin along the wrinkle before the step of directing the beam of radiation to the targeted dermal region.

4. The method of claim 1 further comprising the step of cooling an epidermal region of the skin above the targeted dermal region contemporaneously with the step of causing thermal injury within the targeted dermal region.

5. The method of claim 4 further comprising the step of pre-cooling the epidermal region of the skin above the targeted dermal region before the step of causing thermal injury within the targeted dermal region.

6. A method for treating a wrinkle in human skin, comprising:

generating a beam of radiation having a wavelength of between 1.3 and 1.8 microns and a power density of between 5 and 100 watts per square centimeter;

directing the beam of radiation to a targeted dermal region between 100 microns and 1.2 millimeters below a wrinkle in the skin; and

causing thermal injury within the targeted dermal region to elicit a healing response that produces substantially unwrinkled skin.

7. The method of claim 6 wherein the wavelength is about 1.5 microns.

8. The method of claim 6 further comprising the step of stretching the skin along the wrinkle before the step of directing the beam of radiation to the targeted dermal region.

9. The method of claim 6 further comprising the step of cooling an epidermal region of the skin above the targeted dermal region contemporaneously with the step of causing thermal injury within the targeted dermal region.

10. The method of claim 9 further comprising the step of pre-cooling the epidermal region of the skin above the targeted dermal region before the step of causing thermal injury within the targeted dermal region.

11. An apparatus for treating a wrinkle in human skin, comprising:

a source generating a beam of radiation having a wavelength of between 1.3 and 1.8 microns; and

a delivery system coupled to the source, the delivery system directing the beam of radiation to a targeted dermal region between 100 microns and 1.2 millimeters below a wrinkle in the skin, wherein the beam of radiation causes thermal injury to the targeted dermal region sufficient to elicit a healing response that produces substantially unwrinkled skin, the delivery system further comprising:

a cooling system for contact cooling an epidermal region of the skin above the targeted dermal region, to thereby minimize injury to the epidermal region.

12. The apparatus of claim 11 wherein the delivery system further comprises a fiber coupled to the source, the fiber carrying the beam of radiation; and

wherein the cooling system further comprises a skin contacting portion having a first end in optical communication with the fiber and a second end, the skin contacting portion projecting the beam of radiation toward the targeted dermal region through the second end of the skin contacting portion.

13. The apparatus of claim 12 wherein the skin contacting portion further comprises a window located at the second end of the skin contacting portion, the window being in optical communication with the fiber; and

wherein the skin contacting portion has a fluid passage extending across at least a portion of the window, the fluid passage circulating a cooling fluid past the window.

14. An apparatus for treating a wrinkle in human skin, comprising:

a source generating a beam of radiation having a wavelength of between 1.3 and 1.8 microns;

a delivery system coupled to the source, the delivery system directing the beam of radiation to a targeted dermal region between 100 microns and 1.2 millimeter, below a wrinkle in the skin, wherein the beam of radiation causes thermal injury to the targeted dermal region sufficient to elicit a healing response that produces substantially unwrinkled skin; and

a cooling system for cooling an epidermal region of the skin above the targeted dermal region, to thereby minimize injury to the epidermal region.

15. The apparatus of claim 14 wherein the cooling system comprises a container of cold fluid, wherein the cold fluid is sprayed onto the skin and extracts heat from the skin on contact.